

**Environmental Assessment
Regarding
Management of Hemlock Woolly Adelgid Impacts
In Maine**

**Maine Forest Service
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PURPOSE AND NEED FOR ACTION

In August 2003, the Maine Forest Service (MFS) found hemlock woolly adelgid (HWA) during a routine inspection of native hemlocks on Gerrish Island (Kittery, Maine). A more intensive ground survey of the island and adjacent mainland confirmed the presence of a scattered, low intensity HWA infestation across an area of about 2500 acres in the southwestern coastal towns of Kittery and York (York County). This was the first record of an established HWA population in native hemlock stands in Maine and signalled a need to broaden what had been an exclusion and eradication program to a broader HWA management program.

There is a long list of studies that demonstrate the devastating impact of HWA to infested stands (Orwig and Foster 1998, Ward, Mayer, and Chianese 1992, and Soehn et al 2005). The common thread in these assessments is an inexorable decline in hemlock health and subsequent tree mortality following establishment and unmitigated build-up of HWA. The organisms and amenities that depend on healthy hemlocks decline similarly. The most recent national pest risk map clearly indicates that southern Maine is not immune from such impacts (Figure 1).

The Maine Forest Service considers HWA a serious threat to Maine's hemlock resource. This recognition extends back to the initial detection of HWA in southern New England. A state quarantine was established in 1988 to prevent the artificial introduction of HWA into Maine on infested landscape nursery stock and log shipments. Since 1999 when HWA was found in Maine on infested nursery stock, the MFS and the Maine Department of Agriculture strengthened external quarantine regulations and successfully eradicated over 40 spot infestations on ornamental hemlocks in residential landscapes. All these infestations were linked to nursery stock shipped from infested states.

Unlike the earlier detections, the Gerrish Island infestation does not appear to have been caused by infested nursery stock. The infestation is apparently spreading naturally, dispersed by wind, birds and mammals. There is a previously detected infestation less than 4 miles away in Portsmouth, NH. Since the initial discovery in 2003, infestations in native stands have been detected in 3 other adjacent towns: Eliot, South Berwick, and Wells. **Currently, more than 5000 acres of hemlocks across 119,000 acres in the southern tip of York County are considered infested with scattered, low level HWA populations.**

The MFS assumes that this infestation represents northern expansion from Portsmouth and is the leading edge of the generally infested area in eastern North America. Although HWA must be considered established in this area, the percent of the resource currently supporting detectable HWA populations is still only a very small proportion of the 160,000 acres of hemlock and hemlock/pine stands in south-coastal Maine. **There is tremendous short term value in protecting the as-yet uninfested local hemlocks, and additional long term benefits to that portion of the resource further removed.**

During the fall/winter of 2006/07 veteran staff resurveyed all municipalities in York County. In total, over 75 individual hemlock stands (minimum of 2/town in all municipalities and 4/town in municipalities abutting the known infested core area) were

surveyed using (Costa and Onken 2006). These efforts were augmented by site specific surveys by trained citizen volunteers and by MFS surveys of all mill yards authorized to import hemlock from southern New England.

None of the survey efforts detected HWA outside the 5 currently infested municipalities. While the MFS accepts that there may be some additional isolated spot infestations outside the currently identified “core area”, we remain convinced that the overwhelming bulk of the current infestation in Maine is encompassed by this area. We believe that the outreach/scoping processes and site evaluations conducted in and for these 5 towns are applicable to surrounding jurisdictions in York County. If additional jurisdictions are subsequently determined to support spot HWA populations, survey and scoping activities will be augmented to address those areas.

The MFS believes- based on infestation patterns and infested tree condition- that HWA is newly established and in a very early stage of spread into York County. We are determined to protect uninfested native hemlocks elsewhere in York County and in the rest of Maine. We recognize that simply removing and destroying infested stock, which proved so successful when dealing with individual infested trees, is not a feasible long term solution for addressing the broad scale leading edge situation now present in the 5 town core area. Consequently, we propose to transform Maine’s former exclusion and eradication effort into an integrated Slow-The-Spread program.

AFFECTED ENVIRONMENT

Hemlock is a valuable component of Maine’s forests and local communities. It accounts for 9% of Maine’s softwood inventory, and 5% overall forest inventory (McWilliams et al 2005). From a economic/commodity standpoint, hemlock supplies approximately 10% of the more than 6 million cords of wood which Maine’s forest products sector (paper and lumber) consumes annually.

Maine’s paper and lumber sector pays \$1.2 billion in annual compensation to employees (estimated @ 30,600 people in 1997).

Value added in Maine’s paper and lumber sector totaled just over \$2 billion in 1997, about 6.8% of the Maine economy. Ancillary support activity generated an estimated additional \$4.6 billion: Total value is estimated at approximately 19-20% of Maine’s economy.

Using the 10% furnish share to apportion the economic value and benefit of the paper and lumber industry dependent on hemlock results in an overall annual contribution to economy of \$120 million in mill wages, and 2% of Maine’s economy.

Beyond the economic benefit derived from the processing of the hemlock resource, hemlock stands provide a critical backdrop for Maine’s forest-based recreation industry – particularly in southern Maine. This forest cover (and the dependant/associated fish and wildlife) are critical to Maine’s tourism and local recreation industry. Applying the same 10% factor as was used for paper and lumber results in a conservative estimate that the hemlock resource supports forest-based tourism employment for more than 700 people and contributes more than \$90 million to Maine’s economy.

Hemlock and hemlock/pine types occupy more than 160,000 acres (approximately 14%) of the forests in York County and the surrounding Casco Bay inventory unit (McWilliams et al 2005). Moreover, those 160,000 acres represent almost 1/3rd of the hemlock and hemlock/pine type for the entire state. The disproportionate weighting of hemlock in the local forests in southern Maine clearly demonstrates the importance of the hemlock resource to that local economy.

The economic benefits described above are only part of the story. In addition to the economic benefit provided, the presence and relative abundance of hemlock on Maine's landscape provide critical ecological support services. Hemlock occupies a unique ecological niche. It is a major (45%) component of the softwood forests of southern Maine, and is *the* major softwood component in the riparian zones. It is critical to maintaining stream shade and general overstory in the riparian zone. Beyond just the riparian cover, hemlocks also provide critical avian nesting habitat and deer wintering areas. Loss of this resource would be devastating.

Hemlocks are also a valuable component of Maine's shade tree stock. Their long life and ability to grow and reproduce in shaded sites make them uniquely fitted for landscape settings. They are valuable specimen trees and are frequently used as screening material in landscapes. There are no better alternatives.

Despite the threat posed by HWA, local homeowners *want* hemlock shade and specimen trees. Although there is some anecdotal evidence of shift in species of yard trees being planted, there is still a strong market for hemlock. Many homeowners in southern Maine already contract with professionals for yard maintenance, and the possibility that in the future they may need to periodically treat their hemlocks for HWA is apparently acceptable.

Because there is demand for hemlock shade and specimen trees, the nursery industry in southern Maine has been growing hemlocks for the local nursery/landscape trade. This industry has been increasing in recent years in recognition of the threat posed by importing hemlock (and other) nursery stock. Whereas homeowners and landscapers will buy trees from somewhere, there is ecological as well as economic benefit to maintaining this local capacity and reducing the risk from imports.

The expected impacts of HWA damage to the forests and shade trees in Maine will dramatically affect both the economy and ecosystem.

- ▼ Maine currently has a balanced growth to removal ratio in its forests. Losing a significant proportion of the hemlock component would unbalance this situation, with deleterious effects on the local mills and the communities of Maine that depend on them.
- ▼ Degradation of the hemlock resource would also negatively impact the tourist industry which counts on the forests to serve as a backdrop for recreation.
- ▼ Loss of riparian and deer yard cover will negatively impact Maine's fresh water fishery and wildlife resource.
- ▼ Loss or degradation of shade tree stock will reduce homeowners' quality of life and house resale value.

DECISION TO BE MADE

The population of hemlocks is scattered throughout the infested core area. HWA populations are even more scattered, with various levels of apparent infestation even within single stands. Neither the Maine Forest Service nor the general public is promoting blanket chemical or biological treatment across the core area. This leaves as an alternative site-specific evaluations and decisions; considering the available practical treatment options (affected by access, proximity to surface water, registered chemicals, approved biocontrol agents, cost, etc) and the potential benefit in terms of the protection provided (damage avoided) to on-site forest stands, ornamental/shade trees, and to the off-site hemlock resource (forest stands, ornamental/shade trees, commercial nursery stock). These decisions will be made on a case by case basis, after consultation with, and approval of, individual landowners and the local municipality.

LEGAL BASIS FOR FEDERAL AND STATE ROLES

Federal Role:

Federal financial assistance for forest pest prevention and suppression on forested lands of all ownerships was authorized by the 1990 Farm Bill (PL 101-624). This assistance may be used to protect trees and forests, wood products, stored wood, and wood in use from natural and man-made causes. Financial assistance is also provided to state officials and others to monitor and protect forested lands. Program activity promotes healthy sustainable forests and sustainable economic development.

State Role:

As detailed in MRSA Title 12, the Maine Forest Service is statutorily responsible for prevention and suppression of forest and shade tree pests in Maine.

MRSA Title 12

§ 8101. Forest Health and Monitoring program

Powers and duties. . . .

Conduct and supervise control programs for forest diseases and insects where authorized

Assist in the enforcement of federal and state quarantine laws relating to forest insects and diseases

Conduct applied research related to the management of insects . . . including forest management strategies, insecticide and spray application technologies, integrated pest management techniques and other issues pertinent to the purposes of this chapter

Consult and cooperate with other agencies of the United States, other state governments, the federal and provincial governments of Canada and public and private landowners in the State on applied research, survey and management of forest pest problems

§ 8301:

. . . Responsibility for control of forest insect and disease outbreaks shall, in all but emergencies, rest with the owners of the property whether private or public.

Emergencies, for the purposes of this chapter, shall be so considered when, in the opinion of the director, the infestation or disease is likely to kill or seriously injure trees in large numbers, or is so localized that immediate control will prevent a large possible outbreak, or is of recent foreign origin.

§ 8306:

Authority to quarantine and destroy pest host material A process for the seizure, inspection, destruction or other disposition of any forest or shade tree or any material that exists within the State and is host to a plant pathogen or insect that is the subject of a quarantine or is transported into the State in violation of a quarantine established by the director, the Commissioner of Agriculture, Food and Rural Resources or the Secretary of Agriculture of the United States.

Beyond the statutory authorization, the proposed pest management and pest impact suppression are critical to meet the Maine Department of Conservation's Consolidated Strategic Plan goals and in working with the USDA Forest Service's Northeastern Area 2004-2008 Strategic Plan and the Forest Health Protection program's 2003-2007 national Strategic Plan; all of which strive to assure a healthy and sustainable forest. Moreover, the activities proposed in this EA address the issue of invasive pest species in Maine, and ancillary promote fire and fuels prevention. "Invasive pest species" and "fire and fuels" have been identified as two of the "four threats" to the nation's forests and grasslands for the 21st century by recently retired US Forest Service Chief Dale Bosworth.

PUBLIC INVOLVEMENT

The process for collecting and addressing public concerns regarding managing the threat posed by HWA extends back to 1988 when the Maine, New Hampshire and Vermont developed and imposed parallel external quarantines to prevent inadvertent artificial introduction of HWA into northern New England. For Maine, that process followed the statutory Administrative Procedures Act guidelines which require that the state seek public comment before imposing regulation. This process has continued and evolved through the intervening period: each time that there has been a significant change in the HWA situation in Maine and/or a proposed action on the part of the state, the base information and proposed actions have been publicized. Input has been solicited from specific impacted stakeholders and from the general public.

MFS staff have additionally broadcast these situations via media briefings, news releases, Public Service Announcements and paid advertisements. More targeted efforts have included door-to-door neighborhood sweeps to contact the affected public in the infested core area, and presentations at neighborhood association and special and regular town meetings.

The parties with which MFS has consulted (many on a regular basis) are listed in Appendix 1.

Efforts to Involve other Agencies

Beyond the general scoping efforts, the MFS has specifically consulted with various state and federal agencies on issues where there are overlapping responsibilities:

- ▼ Meetings with the Maine Dept of Inland Fish & Wildlife, US Fish & Wildlife Service (Rachel Carson Preserve), the Maine Dept of Agriculture, USDA-APHIS, and US Forest Service regarding import and release of non-native biocontrol agents.
- ▼ Meetings with the Maine Natural Areas Program, US Fish & Wildlife Service, Maine Dept of Agriculture, Maine Board of Pesticide Control, and US Forest Service regarding potential pesticide options.
- ▼ Meetings with the Maine Dept of Agriculture, Division of Plant Industry, and USDA APHIS-PPQ regarding quarantine issues.
- ▼ Meetings with the Maine Dept of Agriculture, Division of Plant Industry, regarding condemnation of potentially infested nursery stock.

The Governor's Office and the Maine Legislature have been briefed and consulted regularly, resulting in added resources and authorities being provided to the MFS and the Maine Dept of Agriculture to address the HWA situation.

Public support for Maine's current Slow-the Spread effort (both from infested landowners and their threatened neighbors) continues to be virtually universal. There is similar strong support for the Legislature, the Governor's Office and the media. This well demonstrates the success of the scoping and outreach process and satisfaction with the proposed action.

Issues Considered in Detail

The various outreach and scoping sessions surfaced a number of issues. Those that were seen as substantive and were considered in detail are:

- 1) Incorporation of external and internal quarantines to control movement of potentially infested host material, and potential impact on Maine's logging and nursery industries.
- 2) Expansion of legal authority to condemn and destroy infested outlier material in forest settings.
- 3) Public acceptance/support for pesticide treatment options to suppress HWA populations on localized high priority sites. Associated issues centered on:
 - Assurances of EPA and Maine Board of Pesticide Control authorization for target site, pest and dosage;
 - Assurances that water quality and locally defined "sensitive areas" were not threatened;
 - Voluntary participation;
 - Anticipated effectiveness/ necessity for repeat treatments.
- 4) Public acceptance/support for effective biological control agents to suppress established infestations in the core area. Associated issues centered on:
 - Assurances of Maine Inland Fish & Wildlife licensure/permission

- Comfort that proposed biocontrol agents would not threaten populations of native organisms.

Issues 1 and 2 were discussed with the stakeholders. The forest landowners and industry strongly support both and so testified to the 120th Maine Legislature. The vast majority of Maine's nursery industry supports intrastate quarantine regulations and supports continued/expanded condemnation processes so long as the current state-funded "voucher" program can alleviate replacement costs for their clientele. This Maine Dept. of Agriculture program provides credit vouchers redeemable at state-licensed nurseries, and was instituted in 2000 as a way to compensate homeowners for infested hemlocks destroyed under eradication efforts.

Issue 3 was discussed in public municipal meetings in each municipality where spray was anticipated. In response to concerns, the MFS and the Maine Board of Pesticide Control explained label authorization/restrictions, the processes being planned for applying chemicals (and particularly, no aerial application), and the local opportunity to request either foliar or ground treatment. We also clearly explained to the municipalities and individual landowners that they had the opportunity to opt out of the chemical control aspect of the program. These explanations were sufficient to gain support of most stake holders and the acquiescence of the rest.

Issue 4 has been discussed in public meetings in each municipality where release has been contemplated. The plan to release was also publicized in media releases. That the Maine Forest Service could demonstrate that the proposed agents had a proven track record in New England, that we had all necessary permits, and explained that the predators attacked only adelgids (not native insects) was sufficient to gain support of the general public and most stake holders, and the acquiescence of the rest.

Additional Issues/Discussion Points Surfaced

- 5) The local impacted public repeatedly asked for explanation as to the confidence we had regarding precision and accuracy of the on-ground survey techniques: capability for early initial detection, precise delineation, and timely intervention.
- 6) Repeatedly MFS staff heard from the public how much they appreciated the information/outreach initiatives which have provided some sense of familiarity and a assurance that the "State" is staying on top of the issue.

Issue 5 was seen as a non substantive but understandable concern of the stakeholders and the public seeking reassurances that the MFS is committing sufficient resources to address the situation and protect the resource.

Issue 6 was seen as evidence that the outreach program was successfully informing and sensitizing the populace in southern Maine to the HWA situation. This, along with the continued reports from the public regarding potential HWA infestations, is

evidence that the STS program is working. As an ancillary note, there continues to be an on-going and expanding baseline of local support and volunteerism generating and maintaining an involved local HWA surveillance network.

In developing the preferred alternative, the MFS met with public stakeholders and various government and nongovernmental agencies to identify and evaluate significance of potential nontarget impacts (pesticide application to permanent or ephemeral water bodies, extirpation of threatened or endangered species by pesticide or by establishment of exotic predators).

In brief:

- ▼ Where sensitive sites such as municipal water supplies (York Water District) and marine shorelines may harbor infested hemlocks, the proposed project has sufficient alternatives so that chemical treatment on these sites is not necessary for project success. For ephemeral water bodies this concern may also be addressed and avoided by treatment timing.
- ▼ To avoid exposing sensitive organisms and people to pesticides, the MFS is consulting with Maine IF&W, the Maine Natural Areas program, and the Maine Board of Pesticide Control before conducting pesticide treatments. The limited extent of proposed chemical treatments, and the application by licensed professional pesticide applicators and on site spray treatment monitoring by MFS staff, minimizes any risk of off site treatment or on-site impacts to non target organisms. No such impacts are expected.
- ▼ The organisms for which the MFS has release permits are obligate adelgid predators. Where the three adelgid species found in Maine (pine bark adelgid, balsam woolly adelgid, HWA) are all non native, no impact on any native insect species or on parasites and predators with obligate dependencies on native insects are anticipated.

ALTERNATIVES CONSIDERED

Alternative 1: No Action

This alternative would allow HWA populations to spread and fluctuate naturally without any intervention in forests. In residential areas or where hemlocks grow near roads or trails that provide access for ground spraying equipment, landowners would still have the option to chemically treat individual trees to protect them at their own expense. In the forest environment, however, there are no treatments available to minimize the impacts of tree decline and mortality caused by HWA.

Alternative 2: Impose a Strict Quarantine on All Materials Potentially Transporting HWA from the Infested Core Area

This alternative would embargo all movement of material potentially transporting HWA to outside the currently infested area. Intrastate regulatory constraints and public awareness campaigns would be utilized to minimize the chance of inadvertent artificial spread of infested materials from the currently infested area. Intercepted infested

material would be returned to the regulated area or would be destroyed. If successful, the expansion of the infested area would be limited to natural spread rates. Within the infested area, residential shade trees and hemlocks growing near roads or trails that provide access for ground spraying equipment could still be chemically treated by interested landowners at their own expense. In the forest environment, however, there are no treatments available to minimize the impacts of tree decline and mortality caused by HWA.

Alternative 3: Release Predatory Beetles

This alternative would release laboratory reared predatory beetles (currently *Laricobius nigrinus* and/or *Sasajiscymnus tsugae* [Appendix 2] are approved for release in Maine) on clusters of infested trees within the core area to accelerate establishing these predators and eventually reducing the intensity of HWA populations and associated damage in the core area. If populations were to become established fairly rapidly they might also slow the natural spread and impacts of HWA outside the current core area.

Alternative 4: Integrated Chemical and Biological Control (Recommended Action)

To slow the spread of HWA, an array of control options would be used. In addition to the regulatory and biological controls mentioned in Alternative 2 and Alternative 3 above, this alternative would incorporate localized chemical control on high risk infestations.

The term “high risk” as used in this document refers to discrete sites with heavy HWA populations with high interface/overlap with human activity within the core area. Such sites are viewed as significant point sources with elevated potential for human-aided spread (incidental transport on recreational equipment). Sites outside the core area harboring infested nursery stock, irrespective of the intensity of the HWA population, are also considered “high risk” sites in that they pose a similar threat for accelerated spread and establishment of the HWA infestation.

Treatment options would include a foliar treatment of Bifenthrin (Talstar) + 1% horticultural oil and/or soil or stem injections of Imidacloprid (Merit). The nature of the infested area varies from a rural residential with good road access to naturally forested with limited trail access. The presence of wet areas and proximity to the ocean will restrict insecticide use in many areas. Because each infested parcel and/or individual infested tree occupies a unique setting regarding environmental and homeowner sensitivities, and because the level of risk of potential artificial spread similarly varies, each decision as to extent of treatment and material used will be a discrete decision. In any event, landowner approval would be required for each chemical treatment proposed, and in no case will treatments exceed registered rates.

Intrastate regulatory constraints and public awareness campaigns would be utilized to minimize the chance of inadvertent artificial spread of infested materials from the currently infested area.

Purpose of Treatments

The purpose of the proposed action is to reduce the negative impacts of hemlock woolly adelgid on the forest and shade tree hemlock resource of Maine.

Objectives

The objective of these actions is to slow the spread of HWA in Maine (both natural and artificial spread) to:

- a) Minimize long range dispersal. As a target, we would limit detectable population spread to less than one township width per year.
- b) Ameliorate the impact to the local hemlock resource. As a target, we would limit hemlock mortality rates in the infested core area to no more than 110 % of the hemlock mortality occurring elsewhere in York County. Based on the most recent FIA data, hemlock mortality rates in the Casco Bay inventory unit are 0.4% (1,128 cubic feet per year).

Where Action would occur

The area proposed for pest management/suppression is the generally infested “core area” and surrounding York County (Figure 2). Destruction of infested nursery stock and any associated site sanitation could occur anywhere outside the core area.

Linkage to prior Environmental/Biological Assessments

The intervention strategies planned for Maine’s HWA STS program are:

- ▼ Regulatory restraint of host movement,
- ▼ Destruction of infested nursery stock outside the core area,
- ▼ Chemical treatment with bifenthrin/oil and/or imidacloprid,
- ▼ Biocontrol using *Laricobius* and *Sasajiscymnus*,
- ▼ Public education and involvement

These strategies have been fully discussed in other recent EA documents which have cleared the NEPA process (Lombard and Weimer 2006, Soehn et al 2005). The current quarantine regulations have gone through statutory public comment/review; any enhancements proposed as part of this STS program would need to clear a similar public review process. The predators proposed for release were approved by USDA and USF&WS; they have cleared biological assessment evaluations elsewhere in the region and in Maine. The chemical pesticides have been approved for use nationally against adelgids on these sites by the US-EPA, (Appendix 3) and locally by Pesticide Control agencies in states (including Maine and New Hampshire).

ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

Alternative 1: No Action

Because HWA has a high reproductive capacity and has demonstrated the ability to rapidly spread in neighboring states, it is expected that HWA populations will continue to increase throughout the currently infested 119,000 acre area and spread to adjacent currently un-infested areas. Population densities will likely fluctuate depending on the severity of winters, but the beneficial aspects of this would likely be localized within the more northern climates and would be short in duration (1 to 2 years). HWA populations would quickly rebound following such events and, consequently, impacts to hemlock resources would continue to accrue throughout the range of eastern hemlock. As the core infestation intensified and spread, the rates of intensification and expansion would likely increase until most of Maine's hemlock resource would be infested. The lack of any action would virtually guarantee that natural spread would be exacerbated by inadvertent artificial spread, accelerating population spread and hemlock decline.

During this progression, the state HWA quarantine on jurisdictions infested with HWA would need to be expanded to include York County, abandoning any regulatory protection for the northern 80% of the county where HWA has not yet been detected. This expansion would put all of York County under regulation; allow free movement of infested stock into and throughout the county, facilitating immediate expansion to the northern limits of the county. This would exacerbate the spread rate and prematurely threaten adjacent counties. It would also complicate the message to the public regarding "buying locally to avoid spreading the infestation".

Alternative 2: Impose a Strict Quarantine on All Materials Potentially Transporting HWA from the Infested Core Area

This alternative would require that Maine alter its HWA quarantine to impose a town-level quarantine within York County to provide regulatory protection for the 80% of the county that is not yet infested. Crafting and enacting such a quarantine on currently regulated materials (logs, bark-on chips, nursery stock) appears feasible. However, any attempt to regulate movement of currently unregulated items that provide passive transport (recreational vehicles, tents) would be far more problematic. Even if such regulations could successfully be crafted and enacted, it is unlikely that they could be effectively enforced.

But the enforceability issue aside, all the outcomes described for Alternative 1 would, under Alternative 2, hold true within the regulated core area; with the net outcome being rapid intensification and in-filling by HWA within the core area – creating a high risk source.

Without some way to ameliorate the risk posed by passive spread (whether natural or human abetted), any town-level quarantine seems destined to rapid breach, requiring frequent adjustment of the quarantine boundary. The net outcome from this alternative would be analogous to that of Alternative 1 *with* the added long term cost of a public within and outside the core area disenchanted with regulatory ineptitude, and diminished public support for managing HWA (or any other exotic pest species).

Alternative 3: Release Predatory Beetles

This alternative would continue to release *Laricobius nigrinus* and *Sasajiscymnus tsugae* in clusters of infested hemlocks within the core area. Where these proposed biocontrol agents feed solely on adelgids, and where all 3 adelgid species found in Maine (pine bark adelgid, balsam woolly adelgid, and hemlock woolly adelgid) are non native, no direct impact on any native insect species or indirect impact on native parasites and predators with obligate dependencies on native insects are anticipated. These releases have been discussed with the Maine Dept of Inland Fisheries and Wildlife, and all necessary permits have been obtained. In all cases, owners of land proposed for release sites have been contacted and permission granted to use their land and trees for this purpose.

The MFS remains hopeful that an effective cohort of biological controls will eventually become established in Maine such that the impacts of HWA are ameliorated. There have been some very promising indications from studies in Connecticut that this approach can succeed (Cheah et al 2005). This is likely to be an extended process with an uncertain timeline in Maine. Although areas with healthy hemlock trees and lower densities of HWA may recover after predator release and establishment, there is a strong probability that the HWA population will spread and hemlocks be killed before this alternative works. Accepting this prognosis leads us to assume that much of what has been detailed as outcomes for Alternatives 1 and 2 would also occur under this alternative.

Alternative 4: Integrated Chemical and Biological Control (Recommended Action)

Residential Landscapes: HWA can be controlled on individual trees in urban landscapes and residential areas using a number of insecticides, including horticultural oils and insecticidal soaps, provided there is access to the trees for ground spraying equipment and the entire crown can be saturated (McClure 1995). Although southern experience suggests that trees will need annual treatment, tests conducted in 2004 and 2005 indicate that foliar treatment with bifenthrin and oil can provide significant population reduction in southern Maine for at least 2 years (Ouellette in press). There are similar reports of multi-year benefits from imidacloprid soil injections.

Situations involving outlier infested nursery stock are almost exclusively confined to house lots and yards. As a rule, they are heavily managed sites where any proposed sanitation treatments would be within the range of disturbance associated with normal homeowner activities and no more environmentally perturbing. Although the range of situations within the core area where heavy HWA populations could potentially have a high interface/overlap with human activity (parks, trails, roadsides) is broader, most such sites are also “managed sites”.

A large proportion of landowners are situated along road networks and private drives that lead into wooded parcels or landscaped shore lots. Partial to total coverage of native hemlocks with spray insecticides would be possible in most instances. Soil and tree injection provide another effective chemical treatment alternative for those high risk residential trees where foliar treatment might not be appropriate.

In sites where water contamination is a concern or to avoid retreatment issues, owners could be offered the option of removing trees and/or infested branches, especially small solitary groups of infested hemlocks that are isolated from concentrated hemlock growth elsewhere. Removal may also be an option for more heavily infested trees in situations involving very few trees that are isolated or otherwise difficult to treat chemically.

Regarding safeguards associated with any pesticide application conducted under this program: Potential treatments proposed under this EA would occur on **discrete** sites which pose a significant threat for accelerated spread and establishment of HWA, (either specific locations harboring heavy HWA populations with high interface/overlap with human activity or small outlier infestations ahead of the core area). All treatment sites will be vetted against state lists of known sites hosting rare species. NO chemical treatments will be performed in or around a known rare or exemplary community.

The limited extent of proposed chemical treatments, and the application by licensed professional pesticide applicators and on-site spray treatment monitoring by MFS staff, minimizes any risk of off site treatment or on-site impacts to non target organisms. Beyond these safeguards, there are also the requirements of the Maine Board of Pesticides Control, whose responsibilities include promulgation and enforcement of regulations relating to the storage, sale and application of pesticides within the state of Maine. Chapter 22 of their regulations “STANDARDS FOR OUTDOOR APPLICATION OF PESTICIDES BY POWERED EQUIPMENT IN ORDER TO MINIMIZE OFF-TARGET DEPOSITION” specifically addresses managing/minimizing pesticide drift. These regulations establish procedures and standards for the outdoor application of pesticides by powered equipment in order to minimize spray drift and other unconsented exposure to pesticides.

Under the legislative mandate of the Board, as expressed by 7 M.R.S.A. § 606(2)(G), the **primary purpose of these regulations is to "minimize pesticide drift to the maximum extent practicable under currently available technology."**

These rules state that all pesticide applications subject to these regulations (i.e. outdoor application by powered equipment) shall be undertaken such that they comply with designated standards of conduct. In summary, the regulations require that:

- ▼ Prior to and during pesticide spray activities, applicators shall determine and monitor the condition of the equipment to be used, weather conditions, the boundaries of the area to be treated, surrounding properties, including any sensitive areas in the vicinity, and other pertinent factors. These monitoring efforts must be sufficient to assure that spray activities are conducted in accordance with these regulations, pesticide label requirements and otherwise in a manner which complies with law.
- ▼ In any event, spray activities shall immediately cease if there is significant risk that these regulations or label requirements are not being or cannot be satisfied.

The rules contain specific guidelines regarding:

- ▼ Equipment.;
- ▼ Weather Conditions;

- ▼ Identification of Sensitive Areas;
- ▼ Presence of Humans, Animals;
- ▼ Other Requirements.

The rules provide standards for off-target pesticide discharge and residues. (See Appendix 4 for the full text of the Chapter 22 rules).

No significant impacts are expected.

The objective of any of these proposed actions is to reduce the population “hot spots” in the core area and eradicate any infested spots significantly ahead of the core area, thereby reducing point sources which pose a high risk for passive spread. This would slow the population spread from, and dampen the impacts within, the infested core area.

Although the specific sites that might be proposed for treatment under this EA are not yet known, they would mirror, both in range of sizes and in the types of locations, the previous treatments (Appendix 5).

PREFERRED ALTERNATIVE

This integrated Slow-The-Spread program will consist of 4 progressive intervention principles (Exclusion; Eradication; Containment; and Mitigation) to slow the spread of HWA in Maine; addressing both natural and artificial spread, and ameliorating the impact to the local hemlock resource.

The planned Maine HWA STS will incorporate: external and internal quarantines to control introduction and movement of potentially infested host material; legal authority to condemn and destroy infested outlier material; publicly accepted and effective pesticide treatment options to suppress HWA populations on localized high risk sites; publicly accepted and effective biological control agents to suppress established infestations in the core area; intensive on-ground survey techniques to allow early initial detection, precise delineation, and timely intervention; and effective public information/outreach initiatives to enlist public support and generate and maintain an effective local surveillance network.

To avoid exposing sensitive organisms and people to pesticides, the MFS is consulting with the Maine Inland Fisheries and Wildlife, the Maine Natural Areas Program, and the Maine Board of Pesticide Control before conducting pesticide treatments. The limited extent of proposed chemical treatments, and the application by licensed professional pesticide applicators and on site spray treatment monitoring by MFS staff, minimizes any risk of off site treatment or on-site impacts to non target organisms. No such impacts are expected.

The agents for which the MFS has release permits are obligate adelgid predators. Where the three adelgid species found in Maine (pine bark adelgid, balsam woolly adelgid,

HWA) are all non native, no impact on any native insect species or on parasites and predators with obligate dependencies on native insects are anticipated.

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APPENDICES

APPENDIX 1. Listing of Parties/Agencies Contacted as part of Listening/Scoping Processes

- Individual home/landowners (@ meetings and door to door contacts)
- Maine State Agencies
 - Critical Areas Program
 - Department of Agriculture
 - Department of Inland Fisheries and Wildlife
 - Pesticide Control Board
- State Parks
 - Ferry Beach State Park
 - Vaughan Woods State Park
- Towns (managers and some conservation commissions)
 - Eliot
 - Kittery
 - South Berwick
 - Wells
 - York
- Municipal Water Districts
 - Wells
 - York
- Land Trusts
 - Blandings Park Wildlife Refuge
 - Francis Small Heritage Trust
 - Great Works Regional Land Trust
 - Kennebunk Land Trust
 - Kennebunkport Conservation Trust
 - Kittery Land Trust
 - Laudholm Trust/Wells National Estuarine Research Reserve
 - Mount Agamenticus to the Sea Initiative
 - New England Forestry Foundation
 - Saco Valley Land Trust
 - Sanford-Springvale Trust
 - Three Rivers Land Trust
 - York Land Trust
- Landowner Associations
 - Gerrish Island Association
 - Maine Farm Bureau
 - Maine Forest Products Council
 - Small Woodland Association of Maine
 - The Nature Conservancy
- Universities
 - Maine

- Federal Partners
 - USFS
 - USFWS--Rachel Carson Refuge
 - USDA –APHIS-PPQ
- Professional Associations
 - Maine Arborists Association
 - Maine Landscape and Nursery Association
 - Society of American Foresters- Maine Chapter
 - Sustainable Forestry Initiative - Sustainable Forestry Board
- York County Cooperative Extension
- York Soil and Water Conservation District

Appendix 2. Summary information re Biocontrol Agents being contemplated for release against HWA in Maine

Laricobius nigrinus

Laricobius nigrinus is a tiny (< 3 mm) derodontid beetle native to western North America (Zilahi-Balogh et al. 2002). It has been found in close association with HWA on western hemlock in British Columbia, Washington, Oregon and Idaho where HWA is not considered a forest pest (Zilahi-Balogh et al. 2003). *L. nigrinus* was imported into Virginia from British Columbia, Canada, in 1998 and has since been screened in quarantine and evaluated to determine its suitability as a biocontrol agent for HWA in this country. Host suitability tests (tests that determine whether an agent can complete development and reproduce) and host acceptance tests (tests that determine whether an agent will feed or reproduce on a host) indicate that *L. nigrinus* will feed on other adelgid species, but can only complete develop and reproduce on HWA (Zilahi-Balogh et al. 2002). Extensive laboratory and field tests in Virginia have demonstrated *L. nigrinus* to be an excellent natural enemy of HWA (Zilahi-Balogh et al. 2002). In 2000, the USDA Animal and Plant Health Inspection Service (APHIS) issued Permit Number 48928 to Virginia Polytechnic Institute and State University to release *L. nigrinus* in Virginia.

Laricobius adults become active in the early months of the fall and feed on HWA nymphs all winter. In late January, they begin laying eggs in the HWA wool sacs (ovisacs) and continue through June. The eggs hatch two days after an egg is laid and develop through four larval instars, becoming more mobile as they mature (duration ~ 3 weeks). The mature larvae drop to the ground and pupate in the soil at the base of the tree where they aestivate through the summer. The new generation of adults emerge from the soil in the early fall (Lamb 2003).

Sasajiscymnus (Pseudoscymnus) tsugae

Sasajiscymnus tsugae is a coccinellid beetle that occurs naturally in Japan as a natural predator of HWA. It is considered one of the most common and effective predators in that country (McClure 2001). It is adapted to a wide range of climate conditions, strongly prefers to feed on HWA, has a life cycle that is synchronized with that of HWA and possesses a high searching efficiency and dispersal ability. It was the first predator released freely to control HWA. This predatory beetle was also released by the Maine Forest Service during 2002 in the Sanford - Springvale area of York County in a plantation of Eastern white pine, *Pinus strobus* L. infested with pine bark adelgid, *Pineus strobi*, in an attempt to pre-establish it in York County. Previous work in central Maine has demonstrated *S. tsugae*'s ability to survive any winter temperatures likely to be encountered in York County.

Appendix 3. Summary information about the insecticides proposed for use

Bifenthrin

Select information from product label:

TalstarOne - EPA Reg. No. 279-3206

EPA Est. 279-NY-1

Active Ingredient: By Wt.

Bifenthrin*	7.9%
Inert Ingredients:	92.1%
	100.0%

“For ornamental applications (including but not limited to trees, shrubs, ground covers, bedding plants, and foliage plants) apply 0.125 to 1.0 fluid oz. of TalstarOne® Multi-Insecticide per 1,000 square feet or 5.4 to 43.5 fl. oz. per 100 gallons. TalstarOne may be diluted and applied in various volumes of water providing that the maximum label rate (1.0 fluid oz. per 1,000 square feet or 43.5 fl. oz per 100 gallons.) is not exceeded.

TalstarOne may be applied through low volume application equipment by dilution with water or other carriers and providing that the maximum label rate (1.0 fluid oz. per 1,000 square feet or 43.5 fl. oz per 100 gallons) is not exceeded.

Apply the specified application rate as a full coverage foliar spray.

Repeat treatment as necessary to achieve control using higher application rates as pest pressure & foliage area increases. Repeat application should be limited to no more than once per seven days..”

Imidacloprid

Select information from product label:

Merit 75 WSP - EPA Reg. No. 3125-439

Active Ingredient:

Imidacloprid, 1-[(6-Chloro-3-pyridinyl)methyl]- <i>N</i> -nitro-2-imidazolidinimine	75%*
Other Ingredients: .	25%
	100%

“MERIT 75 WSP Insecticide is for use on ornamentals in commercial and residential landscapes and interior plantscapes. MERIT 75 WSP Insecticide is a systemic product and will be translocated upward into the plant system from root uptake. To assure optimum effectiveness, the product must be placed where the growing portion of the target plant can absorb the active ingredient. The addition of a nitrogen containing fertilizer, where applicable, into the solution may enhance the uptake of the active ingredient. Application can be made by foliar application or soil applications; including soil injection, drenches, and broadcast sprays. Foliar applications offer locally systemic activity against insect pests.

When making soil applications to plants with woody stems, systemic activity will be delayed until the active ingredient is translocated throughout the plant. In some cases, this translocation delay could take 60 days or longer. For this reason, applications should be made prior to anticipated pest infestation to achieve optimum levels of control.

For outdoor ornamentals, **broadcast applications** cannot exceed a total of 8.6 oz (0.4 lb of active ingredient) per acre per year.”

Appendix 4. Maine Board of Pesticide Control Chapter 22 Regulations

STANDARDS FOR OUTDOOR APPLICATION OF PESTICIDES BY POWERED EQUIPMENT IN ORDER TO MINIMIZE OFF-TARGET DEPOSITION

SUMMARY: These regulations establish procedures and standards for the outdoor application of pesticides by powered equipment in order to minimize spray drift and other unconsented exposure to pesticides. The primary purpose of these regulations is to implement the legislative mandate of the Board, as expressed by 7 M.R.S.A. § 606(2)(G), to design rules which "minimize pesticide drift to the maximum extent practicable under currently available technology."

SECTION 1. EXEMPTIONS.

The regulations established by this chapter shall not apply to pesticide applications in any of the following categories:

- A. Applications of pesticides confined entirely to the interior of a building;
- B. Applications of pesticides by non-powered equipment;
- C. Applications of pesticides exclusively in granular or pelletized form;
- D. Applications of pesticides injected underground or otherwise injected directly into the target medium. Such applications must involve no spraying of pesticides whatsoever.

SECTION 2. STANDARDS OF CONDUCT FOR PESTICIDE APPLICATIONS.

All pesticide applications subject to these regulations shall be undertaken in compliance with the following standards of conduct:

- A. General Requirements.
 - I. Prior to and during pesticide spray activities, applicators shall determine and monitor the condition of the equipment to be used, weather conditions, the boundaries of the area to be treated, surrounding properties, including any sensitive areas in the vicinity, and other pertinent factors. These monitoring efforts must be sufficient to assure that spray activities are conducted in accordance with these regulations, pesticide label requirements and otherwise in a manner which complies with law.
 - II. In any event, spray activities shall immediately cease if there is significant risk that these regulations or label requirements are not being or cannot be satisfied.
- B. Equipment.
 - I. Pesticide spray equipment shall be used in accordance with its manufacturer's recommendations and instructions, and shall be in sound mechanical condition, free of leaks and other defects or malfunctions which might cause pesticides to be deposited off-target.
 - II. Pesticide spray equipment shall be properly calibrated. Calibration shall occur with sufficient frequency, depending on extent and type of use of equipment and pesticides employed, so that equipment remains reasonably close to calibration specifications when in use. Applicators shall maintain work sheets to show types of nozzles, pressure, boom height and speed of equipment at time of calibration and a brief description of the calibration method.
 - III. Pesticide application equipment shall have properly functioning shut-off valves or other mechanisms which enable the operator to prevent direct discharge and

minimize drift to non-target areas. Spray equipment designed to draw water must also have a properly functioning antisiphoning device.

C. Weather Conditions.

- I. Spray applications shall not be undertaken when weather conditions favor pesticide drift onto sensitive areas or otherwise prevent proper deposition of pesticides on target.
- II. Spray applicators shall be familiar with all weather conditions and related factors which affect settling of pesticides on to or off target. Such factors include temperature, inversion, wind speed and direction, potential for drift and volatilization, equipment functioning and pertinent label instructions.
- III. Pesticide application must cease immediately when visual observation reveals or should reveal that spray is not being deposited on target.
- IV. Without limitation of the other requirements herein, under no circumstances shall pesticide application occur when wind speed in the area is in excess of 15 m.p.h.

D. Identification of Sensitive Areas.

- I. Prior to spraying a pesticide, the applicator must become familiar with the area to be sprayed and must identify and record any sensitive area located within 500 feet of the target area. Applicators shall be prepared to demonstrate by production of a map, sketch, field notes, log or other documentation that this requirement has been met. These records of sensitive areas shall be retained by or on behalf of the applicator for a period of two years following the date of applications and shall be made available to representatives of the Board upon request. This requirement shall not apply to turf, ornamental tree and plant or structural pest control applications.
- II. Prior to spraying by aerial application, the field or other area to be sprayed shall be clearly identified by means of ground markings or other physical identification characteristics clearly visible from the air.

E. Presence of Humans, Animals.

Pesticide applications shall be undertaken in a manner which minimizes exposure to humans, livestock and domestic animals.

The applicator shall cease spray activities at once upon finding evidence showing the likely presence of unprotected persons in the target area or in such proximity as to result in unconsented exposure to pesticides.

F. Other Requirements.

These regulations are intended to be minimum standards. Weather and topographical conditions, proximity to areas of particular sensitivity and other factors may require the applicator to take special precautions, beyond those set forth in these regulations, in order to avoid adverse impacts on off-target areas and to protect public health and the environment. Moreover, these regulations are not designed or intended, nor should they be construed, to affect rights of private citizens in civil actions arising out of the negligent use or other misapplication of pesticides.

These regulations also do not affect pesticide label instructions, which may be more restrictive in certain cases. Under federal and state law, wherever particular label instructions impose standards which are more restrictive than these regulations, such label instructions must be followed. Similarly, these regulations do not affect more restrictive regulations or guidelines applicable to particular types of pesticide applications.

SECTION 3. GENERAL STANDARDS FOR OFF-TARGET PESTICIDE DISCHARGE AND RESIDUE.

- A. Prohibition of Unconsented, Off-target Direct Discharge of Pesticides.

Pesticide applications shall be undertaken in a manner which does not result in off-target direct discharge of pesticides, unless prior authorization and consent is obtained from the owner or lessee of the land onto which such discharge may occur.
- B. Standards for Unconsented, Off-Target Drift.
 - I. General Standard. Pesticide applications shall be undertaken in a manner which minimizes pesticide drift to the maximum extent practicable, having due regard for prevailing weather conditions, toxicity and propensity to drift of the pesticide, presence of sensitive areas in the vicinity, type of application equipment and other pertinent factors.
 - II. Prima Facie Evidence of Violation. Without limiting the generality of subsection I above, the presence of pesticide drift residues in excess of any of the following levels shall constitute prima facie evidence that the applicator did not take reasonable precautions to minimize pesticide drift to the maximum extent practicable:
 - (i) Pesticide residues in any off-target sensitive area in the vicinity of an application site which exceed 20% of the residues found, or which with proper application technique would have occurred, within the target area. For purposes of this standard, residue levels, within both a target area and an off-target sensitive area, may be determined by evaluation of one or more ground, foliage or other samples, or by extrapolation or other appropriate techniques.
 - (ii) Pesticide residues on any off-target sensitive area in the vicinity of an application site which result in damage to crops, vegetation or other species within the sensitive area.
 - (iii) Pesticide residues on any off-target organic farm or garden in the vicinity of an application site which causes the organic products thereof to fail to meet the tolerance for organic agricultural commodities because residue testing detects prohibited substances that are greater than five percent of the Environmental Protection Agency's tolerance for the residue detected. This standard shall apply only where, prior to the time the pesticide application occurs, the owner or operator of the organic farm or garden notifies the owner or lessee of the land to be sprayed, with such notice identifying the farm or garden as organic.
 - (iv) The residue standards in this subsection II for off-target drift do not apply where the owner or lessee of the off-target area receiving pesticide drift has given authorization and consent as prescribed under subsection C of this section.
 - III. Standards for Particular Pesticides. The Board may by rule provide more restrictive residue standards than those prescribed herein for particular pesticides, where pesticide toxicity, propensity to drift or other circumstances warrant.
- C. Consent; How Given.
 - I. Authorization and consent by the owner or lessee of land receiving a pesticide discharge or drift may be given in any manner, provided that the consent is reasonably informed and is given prior to the onset of the spray activity in question. The burden of proof shall be upon the applicator to demonstrate that requisite authorization and consent has been given. For this reason, applicators

are encouraged to obtain such consent in writing and to maintain records thereof.

- II. Except with the prior written approval of the Board, no authorization or consent may be given with regard to off-target direct discharge or off-target drift of pesticides upon any bodies of water or critical areas as defined in Chapter 10, "Definitions; Sensitive area."

SECTION 4. DRIFT MANAGEMENT PLAN.

A. Purpose.

Landowners, lessees and/or spray applicators may develop a drift management plan to cover applications undertaken by or on behalf of them. The purpose of such a plan shall be to minimize the occurrence and adverse effects of pesticide drift. Where a drift management plan is in effect and complied with, management flexibility may be enhanced.

B. Contents

A drift management plan must contain measures designed to meaningfully reduce and minimize the incidence and adverse effects of off-target drift of pesticides, with a particular view to protecting sensitive areas. Such measures shall consider and include at least some of the following elements:

- I. The establishment of no-spray buffer zones between spray blocks and sensitive areas to minimize drift;
- II. Spraying only when maximum wind speed and/or direction are as prescribed by the plan, with that prescription being less than the maximum allowable wind speed established under section 3C IV;
- III. The use of coarse spray droplets created by a combination of special nozzles, pressures and particulating agents;
- IV. The use of specialized equipment designed to minimize spray drift;
- V. The use of wind shields or breaks to deflect or contain spray drift away from sensitive areas;
- VI. The use of closest possible points of spray release to the target in order to minimize drift;
- VII. The use of lowest effective rates of application of pesticides;
- VIII. The use of integrated pest management techniques, including planting of pest resistant varieties, removal of pest host plants, long-range planning to rotate crops and monitor fields, and other measures designed to minimize the use of pesticides over the planting season and/or over several planting seasons;
- IX. Posting of the area to be sprayed or other forms of effective public notification, provided that this measure must be accompanied by other measures designed to reduce drift;
- X. Other specific measures stated in the plan which are effective in minimizing the incidence and adverse effects of pesticide drift.

C. Procedure.

Any person wishing to operate under a drift management plan must prepare the plan in writing, stating with specificity the measures which will be used, and how they will be used, in reducing the incidence of drift and protection of sensitive areas. The plan shall also include a map, aerial photograph or sketch of the area(s) to be sprayed, the crops to be treated, the pesticide(s) and equipment which may be used, the target pest(s), and the monitoring techniques and thresholds which will be used in making a decision to spray a given area. The plan shall be dated and signed by the person(s) responsible for carrying out its provisions, who shall also provide an address and telephone number by which (s)he can be reached.

D. Filing; Review by Board.

The drift management plan need not be filed with the Board but must be retained by the person having responsibility for pesticide application. Notification to the Board of the existence of the plan shall be submitted on forms to be prepared by the Board. The Board may from time to time review any plan for adequacy in providing for minimum drift and protection of sensitive areas. If the Board requests a copy of the complete plan, it shall be promptly submitted. If the Board at any time determines that a plan is not adequate, or is not sufficiently detailed to allow for an evaluation of its adequacy, it shall notify the person responsible for the plan and provide an opportunity for that person to amend the plan in order to make it adequate. The Board may notify that person of amendments or conditions which would make the plan acceptable. Any plan determined by the Board to be inadequate shall be declared invalid by the Board.

E. Period of Effectiveness.

A drift management plan shall be effective for a period of two years, after which it must be updated by the person responsible for its preparation. The Board shall be notified in writing of the updated plan.

F. Legal Effect of Plan.

Operating under a drift management plan does not allow an applicator to avoid compliance with the requirements of Section 2 and 3A of these regulations. Departure from the standards of Sections 3 and 4A requires a variance permit under Section 6.

G. Enforcement.

In the event of an incident involving alleged pesticide drift or other misapplication where a drift management plan was in effect, the Board shall examine the adequacy of the plan and may declare the same inadequate or recommend further amendments or conditions. The Board shall take into consideration the existence of and good faith compliance with a plan in determining whether further enforcement action by the Board is necessary.

SECTION 5. VARIANCES FROM STANDARDS

A. Variance Permit Application.

An applicator may vary from any of the standards imposed under this chapter by obtaining a permit to do so from the Board. Permit applications shall be made on such forms as the Board provides and shall include at least the following information:

- I. The name, address, and telephone number of the applicant;
- II. The area(s) where pesticides will be applied;
- III. The type(s) of pesticides to be applied;
- IV. The purpose for which the pesticide application(s) will be made;
- V. The approximate date(s) of anticipated spray activities;
- VI. The type(s) of spray equipment to be employed;
- VII. The particular standards from which the applicant seeks a variance;

- VIII. The particular reasons why the applicant seeks a variance from such standards, including a detailed description of the techniques to be employed to assure a reasonably equivalent degree of protection and of the monitoring efforts to be made to assure such protection;
 - IX. The names and addresses of all owners or lessees of land within 500 feet of the proposed spray activity, and evidence that such persons have been notified of the application. The Board may waive this requirement where compliance would be unduly burdensome and the applicant attempts to notify affected persons in the community by another means which the Board finds reasonable.
- B. Board Review; Legal Effect of Permit, Delegation of Authority to Staff.
- I. Within 60 days after a complete application is submitted, the Board shall issue a permit if it finds that the applicant will achieve a substantially equivalent degree of protection as adherence to the requirements of this chapter would provide and will conduct his activities in a manner which protects human health and the environment. Such permit shall authorize a variance only from those particular standards for which variance is expressly requested in the application and is expressly granted in the permit. The Board may place conditions on any such permit, and the applicant shall comply with such conditions. Except as conditioned in the permit, the applicant shall undertake spray activities in accordance with all of the procedures described in his application and all other applicable legal standards. Permits issued by the Board under this section shall not be transferable or assignable except with further written approval of the Board and shall be valid only for the period specified in the permit.
 - II. The Board may delegate authority to review applications and issue permits to the staff as it feels appropriate. All conditions and limitations as described in Section 5(B)I shall remain in effect for permits issued by the staff. If the staff does not grant the variance permit, the applicator may petition the Board for exemption following the requirements set forth in 22 MRSA §1471-T, "Exemptions."

STATUTORY AUTHORITY: 7 M.R.S.A. § 606(2)(G):
22 M.R.S.A. § 1471-M(2)(D)

EFFECTIVE DATE:
January 1, 1988

AMENDED:
October 2, 1996

EFFECTIVE DATE (ELECTRONIC CONVERSION):
March 1, 1997

AMENDED:
September 22, 1998 - also converted to MS Word
January 4, 2005 – filing 2004-603 affecting Section 3.B.II.(iii)

APPENDIX 5. Past Treatments

Treatments of Infested Outlier Nursery stock 1999-2005:

Between 1999 and 2005, a total of 101 sites harboring potentially infested nursery stock were located and treated for HWA (below)

Number of HWA Infested Sites Treated, 1999-2005

Planting	1999	2000	2001	2002	2003	2004	2005	Total
1999 Shipment	57	5	5	4	0	0	0	71
Other Introductions	1	8	10	7	2	1	0	30
Total Number Sites:	58	13	15	11	2	1	0	101

Although some of these sites (primarily in 1999) were prophylactically treated because they had suspect nursery stock associated with infested hemlock shipments, actual infestations occurred in 19 towns in 8 counties in the southern half of the state (Figure 3).

Regarding the 1999 shipment of infested nursery stock:

A total of 147 hemlocks from both the uncertified shipment and commingled hemlock stock were identified in 56 landscape sites during late summer and fall of 1999. All sites were inspected for HWA and sprayed by an independent commercial pesticide applicator. The sites with trees from Rockport were treated with bifenthrin (Talstar) mixed @ 5 oz. /100 gallons water with a 1% horticultural oil solution. Sites with hemlocks from York were treated with a 1% horticultural oil/water solution. Any intermingled hemlocks at these sites were also treated.

Although the survey in 1999 of outplanted uncertified hemlocks from the York and Rockport garden centers detected only a single infested tree (in York), over the next five years infested hemlocks were found on an additional 14 of the monitored sites. As additional infested trees at these sites were subsequently found to harbor HWA (after 1999), these sites were treated (all infested hemlocks and any hemlocks within 300 feet) with Talstar mixed @ 5 oz. /100 gallons water with a 1% horticultural oil solution. All application was conducted by a licensed pesticide applicator (with MFS monitor) using hydraulic spray equipment. Infested trees and any nearby touching hemlocks were subsequently removed, chipped, double bagged and burned at a bio-energy burn facility.

A total of 39 trees from the 1999 shipment were removed and destroyed from 2000 to 2002. Any sites where HWA was detected were rescheduled for 5 years of additional monitoring.

Regarding introductions not associated with the 1999 shipment:

Between 2000 to 2003, HWA was found on 30 sites on planted hemlocks from sources other than the 1999 uncertified shipment. Almost all these detection resulted from

reports from the property owner or the groundskeeper who had been sensitized by the outreach /awareness efforts. In all cases, the infested sites had hemlocks imported from outside Maine (substantiating the hypothesis that the trees were infested when imported).

In addition to the planted trees that were found infested, 6 infested hemlocks from a shipment linked to another state were discovered at a garden center in Brewer during a nursery inspection by the Maine Department of Agriculture.

On these 30 sites, the individual infested hemlocks and all other hemlocks within 300 feet were sprayed with Talstar mixed @ 5 oz. /100 gallons water with a 1% horticultural oil solution. All application was conducted by a licensed pesticide applicator (with MFS monitor) using hydraulic spray equipment. Infested trees and any nearby touching hemlocks were subsequently removed, chipped, double bagged and burned at a bio-energy burn facility.

A total of 111 planted hemlock trees were destroyed on these 30 sites. Any sites where HWA was detected were scheduled for 5 years of monitoring.

Overall: a total of 143 infested outplanted trees at 44 sites were destroyed between 1999 and 2005. All intercepted infestations were light and confined to trees in home landscapes. These infestations were very difficult to find and often took repeated monitoring over several seasons to detect. An additional 64 nursery trees were destroyed while still at garden centers.

Spray Treatments in 2004:

Thirteen (13) sites with a total of 67 properties in the towns of Kittery, York, and Wells were proposed for chemical treatments based on high HWA density and the risk of artificial spread due to proximity to roads and residential yards. Thirty six (36) of the originally proposed 67 properties were treated (Figure 4). Locations of the proposed and treated sites are detailed below:

Site	Properties Offered Spraying	Properties Sprayed	Estimated Acreage
Southside Rd., York	6	4	4
Brave Boat Harbor Rd., York	5	2	3
Bartlett Rd, Kittery	3	3	3
Charles Hill, Kittery	1	0	0
Cutts Island Lane., Kittery Pt.	1	0	0
Route 103, Kittery Point	2	2	2
Chauncey Creek Area, Kittery Pt	1	1	0.5
Haley Road near Crossing, Kittery	1	0	0
Coleman Ave, Kittery	1	1	1
Yankee Commons,. Mbl Homes, Kittery	17	9	8
Gerrish Island, Kittery Pt.	25	12	19
Lynch Lane, Kittery	1	0	0
Burnt Mill Rd, Wells	3	2	2.5
Total:	67	36	43 Ac.

The spray treatment was conducted over a 2-day period from October 26th to 27th with a total application of 900+/- gallons Talstar plus horticultural oil mix at the rate of 16 ounces/100 gallons for Talstar and 2 gallons/100 gallons for horticultural oil. All trees were sprayed from the ground with a truck mounted pressure sprayer by licensed professional pesticide applicator (with MFS monitor) and only where landowners had signed approval forms. Average size of property treated was 1.2 acres, and only the hemlock component was treated.

Spray Treatments in 2005:

Three (3) sites with a total of 17 properties were proposed for treatment in 2005 (Figure 5). Two of the sites were properties in York and Kittery Pt. previously proposed for treatment in 2004 where the owners had not signed approval forms in time to be included in the 2004 treatment. The third selected site was a newly discovered infested spot in Eliot consisting of 7 properties with high concentrations of hemlocks. Fourteen (14) of the originally proposed 17 properties were treated. Locations of the proposed and treated sites are detailed below:

Site	Properties Offered Spraying	Properties Sprayed	Estimated Acreage
Cutts Island Lane., Kittery Pt.	3	1	1
Southside Rd., York	7	7	5
Brixham Rd., Eliot	7	6	6
Totals:	17	14	12 Ac.

The spray treatment was conducted on October 28th with a total application of 250 gallons Talstar plus horticultural oil mix at the rate of 15 ounces/100 gallons for Talstar and 2 gallons/100 gallons for horticultural oil. All trees were sprayed from the ground with a truck mounted pressure sprayer by licensed professional pesticide applicator (with MFS monitor), and only where landowners had signed approval forms. Average size of property treated was less than 1 acre, and only the hemlock component was treated.

FIGURES

Figure 1. Projected hemlock mortality (percent basal area) area caused by Hemlock Woolly Adelgid, 2006-2021 (derived from 2005 National Pest Risk Map)

Figure 2. HWA infested stands and delineated “core” HWA management area, York County, Maine

Figure 3. Location of landscape settings with outplanted HWA-infested hemlocks

Figure 4. Proposed HWA core area spray treatments, 2004 York County, Maine

Figure 5. Proposed HWA core area spray treatments, 2005 York County, Maine